

XIX.—*Ptolemy's Geography of the British Isles.* By HENRY BRADLEY, Esq.

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To the Alexandrian Claudius Ptolemy, who flourished about the middle of the second century after Christ, belongs the honour of having achieved the final systematisation of the results of ancient research in the two sciences of astronomy and geography. His treatise on Geography continued to be the standard text-book on its own subject, as his *Almagest* was the standard text-book on astronomy, until the brilliant discoveries of the fifteenth century called the attention of Europe to their defects.

The portion of Ptolemy's Geography relating to Britain has been for three centuries the subject of much elaborate discussion among English antiquaries. With regard, however, to the identification of very many of Ptolemy's positions, the conclusions of recent authorities of eminence are very far from being unanimous. This divergence of opinion is in part due to the imperfections of Ptolemy's own knowledge of British geography; but to a much greater extent it may be ascribed to the extreme laxity of the methods of investigation which have usually been adopted. In attempting an original examination of this subject I am deeply sensible of the disadvantages arising from my unavoidably scanty acquaintance with the work of previous inquirers. The strongly favourable opinion of some eminent scholars, to whom an outline of the present Paper has been submitted, has, however, induced me to venture on offering it to the Society.

The information supplied by Ptolemy consists essentially of a table of latitudes and longitudes. From the geographer's own statement (*Geog.* I. xvii. 2, II. i. 9) it appears that he intended this table to serve as a sufficient guide to the draughtsman without the necessity of any reference to previously existing delineations. It would seem unquestionable that in order to make any trustworthy use of Ptolemy's indications of positions our first step must be to employ them in the construction of such a map as Ptolemy himself would have

drawn.^a Obvious as this proposition appears, however, its truth has been by many eminent writers practically overlooked. In some cases it would seem that the places mentioned by Ptolemy have been identified with known localities purely on the ground of supposed similarities in local names, without any regard to the positions assigned to them by the geographer. Some writers, again, have contented themselves with laying down Ptolemy's angular measurements, converted into linear distances, on the map of the country as now known, and have in this way arrived at conclusions which an inspection of the Ptolemaic map would at once show to be extravagantly improbable.^b But even those inquirers who have founded their theories on a delineation of the whole or part of Ptolemy's map have not, so far as I am aware, been sufficiently careful to avoid sophisticating the evidence of Ptolemy by the introduction of details derived from their own independent geographical knowledge. Moreover, instead of following rigorously, for better and worse, the text of some one editor, they have generally yielded more or less to the temptation to indulge in desultory attempts at textual criticism.

The map subjoined to this Paper is intended to be a strictly accurate rendering into graphic form of Ptolemy's table of British positions, as represented in the Greek edition of Nobbe (Leipzig, 1846).^c The projection employed is that authorised by Ptolemy himself (*Geog.* II. i. 10); that is to say, a projection in which the meridians and parallels are represented by straight lines at right angles to each other, the proportion in length between the degree of latitude and that of longitude being that which is correct for the middle parallel of the map. The positions assigned by Ptolemy are indicated, in the case of towns, by the usual small circle, and in other cases by a small cross. It will be observed that in completing the outline of the coast I have made use of *straight* lines to

^a It may perhaps be imagined that we might content ourselves with the maps which are given in the MSS. of Ptolemy, which are presumably reproductions of those drawn under the author's superintendence by a certain Agathodæmon. By taking these maps as the basis of our discussion, however, we should be liable to be misled by details introduced by the draughtsman, for which Ptolemy affords no authority. However valuable these maps may be as aids to the criticism of Ptolemy's text, they cannot be made a substitute for the text itself.

^b A recent exemplification of this fallacious method is supplied by the Papers by Mr. Gordon Hills in the *Journal of the British Archaeological Association* for 1878 and 1881, which have gained a sort of authoritative rank far in excess of their real merits, through the deference paid to them in Prof. Rhys' work on *Celtic Britain*.

^c The first copy I made of the map was drawn from the text of Ptolemy as given in the *Monumenta Historica Britannica*, and the conical projection was employed instead of the rectilinear one described above. There is, however, no very striking difference between the two delineations.



MAP OF THE "BRETANIC ISLANDS," ALVION AND IVERNIA.

Constructed from the Latitudes and Longitudes given by Ptolemy.

connect the points laid down on Ptolemy's authority. This, no doubt, gives to the delineation a formal and inartistic appearance; but the picturesque undulations of outline, in which map-makers delight, would have been liable to suggest identifications for which there was no real foundation. With regard to the territories occupied by the several nationalities, the information afforded by Ptolemy is almost entirely confined to the enumeration of the towns which belonged to each people. The tribal boundaries as I have drawn them can therefore claim only a loose approach to correctness. I have however preferred to insert them rather than to leave the map seriously incomplete as a representation of Ptolemy's statements. The precise extent to which these boundaries possess authority is in most cases determined by the towns included within the several territories. There is only a single instance amongst the British positions of Ptolemy in which the reading of Dr. Nobbe's text results in any graphical impossibility. This is in the case of Salinæ, mentioned by Ptolemy as a town of the Catyeuchlani. The position assigned to this place (long. 18° , lat. $55\frac{3}{4}^{\circ}$) is inconsistent with the situation of the territory of the tribe to which it belonged, and I have therefore found it necessary to omit this name. In every other instance the map is a faithful representation of the readings of the edition above referred to, although there is reason to doubt whether Ptolemy is really responsible for all the serious errors which appear in the positions, especially of inland towns.

Before speaking in detail of Ptolemy's special geography of Britain, it will be well to say a few words respecting the character of his knowledge of geography in general. It is not at all uncommon to find even educated people entertaining the strange notion that "the ancients" believed that the earth was flat. Of course the sphericity of the earth was a commonplace of philosophy ages before Ptolemy was born. Moreover, Ptolemy's estimate of the size of the earth was surprisingly near to the truth. He tells us (*Geog.* I. xi. 2) that the length of a degree of a great circle is 500 stadia, which makes the circumference of the earth one-sixth too small. Curiously enough, an earlier Alexandrian geographer, Eratosthenes, had committed an opposite error of precisely equal amount, having made the circumference one-sixth too large. If there had been any one to take the average between these two estimates, the resulting calculation of the size of the globe would have been almost absolutely correct. Ptolemy's degrees of longitude are measured from the western extremity of the known world, *i.e.*, from the Fortunate Islands, and his degrees of latitude like ours from the equator. As he divides his degrees not into minutes but into twelfths, any error in his mea-

surements smaller than 5' may be regarded as non-existent. It may be mentioned that the terms latitude and longitude (referring to the "breadth" and "length" of the known world) seem to have been the invention of Ptolemy himself.

In criticising the correctness of Ptolemy's geographical descriptions, it should be remembered that he had to depend for his information on the reports of travellers who were unfurnished with the instruments which we consider indispensable for the ascertaining of geographical data. The ancient navigators had no mariner's compass, no nautical almanac, no sextant, and no chronometer. Although Ptolemy's map of Britain may at first sight seem grotesquely inaccurate, yet if we consider the nature of the ancient means of observation we shall find abundant reason for admiring the industry and ingenuity by which their disadvantages were so largely surmounted.

On reference to the accompanying map it will be seen that the outline of what we call England bears a very recognisable general resemblance to that of the country as now known. But instead of Scotland appearing, as it ought to do, as a continuation of England towards the north, it is twisted round sharply to the east. Ptolemy's map of North Britain, in fact, looks like a map of Scotland turned over on its side.

It has been supposed by some writers (amongst others by no less eminent an authority than Mr. Skene) that this extraordinary mistake originated in the confused and extravagant reports which the fleet and army under Agricola rendered respecting their North British expeditions. Mr. Skene quotes Tacitus (*Agr.* 25) to show that Agricola's forces on this occasion were in a mood little favourable to any accurate description of the country in which they were engaged. This explanation I am unable to accept, for two reasons. In the first place the mistakes and exaggerations of Agricola's companions might no doubt have resulted in a very distorted delineation of the outline of the coast, but not in a regular and consistent substitution of due east for due north, which is what we find in Ptolemy's map. In the second place, Tacitus, who wrote the account of this very expedition, did not share at all in Ptolemy's mistake. Tacitus states that earlier writers had compared the shape of Britain to that of an axe or small shield. This comparison he admits to be fairly correct for the nearer half of Britain, but the remoter half, he says, extends northwards in the form of a prolonged wedge.

My own hypothesis in explanation of Ptolemy's mistake is, that either he or one of his predecessors had before him three sectional maps, representing

severally what we call England, Scotland, and Ireland, and drawn approximately to scale, but without meridians or parallels. It was no doubt then, as now, usual for a map to be enclosed in a rectangular frame, with sides towards the four cardinal points. In fitting the three maps together, Ptolemy (or his predecessor) fell into the mistake of turning the oblong map of Scotland the wrong way. I think it is even possible to discover the process by which he was led astray. From some cause, he had assigned to Ireland a latitude so much too high that if he had given to the map of Scotland its proper orientation, a portion of that country must have fallen right across the western island. This theory as to the origin of Ptolemy's error has not, so far as I know, been precisely anticipated,^a but I believe it is the only one yet proposed which adequately accounts for the facts. If it be sound, it will have a decisive bearing on several disputed questions relating to the identification of Ptolemy's positions.

I will now proceed to discuss in detail Ptolemy's description of the coast of *Alvion*, or, as he elsewhere calls it, *Great Britain*.^b It will be convenient to begin this examination at the point where Ptolemy's great error commences, viz. at the Solway Frith. In accordance with the preceding remarks, the reader should compare Ptolemy's map of North Britain with a modern map of Scotland laid upon its side.

The Solway Frith is called by Ptolemy "*Ituna*." This name is plainly identical with that of the river *Eden*. We thus learn that the common derivation of *Eden* from the Anglo-Saxon *ea-denu*, river-valley, is erroneous, and that the true etymology must be either Celtic or pre-Celtic, identical probably with that of the river-names *Ithon* and *Ythan*. Although the present name of the estuary is not mentioned by Ptolemy, it seems to have existed in his time, and to have given its appellation to the adjacent tribe of the *Selgovæ*. The ablest Celtic philologists, however, invert this order of derivation, and trace the tribal name to the root *selg*, to hunt. There can be little doubt that the population next in order on the map, the *Novantæ*, received their name from the river *Novius*, now the *Nith*. It is remarkable that the inhabitants of the district continued to be designated from the river after it had received its present name. *Bede* mentions them as *Niduari*. Ptolemy's "*peninsula of the Novantæ*," ending in a cape named from the same people, is obviously the peninsula of *Galloway*; but it will be seen that

^a The nearest approach to an anticipation seems to be the view of General Roy, that a portion of the map followed by Ptolemy had been accidentally torn off and joined again in the wrong place. This explanation, however, is both far less probable and far less adequate than the one given above.

^b The use of this name by Ptolemy shows that our island is so called as being the greater of the British islands, and not, as has been sometimes supposed, in contradistinction to *Brittany*.

he was completely in error with regard to its form and the direction in which it projects from the mainland.

Three of the names occurring in this part of the map are still retained—Deva (now the Dee), Rerigonius (Loch Ryan), and Clota (the Clyde). Luce Bay was Abravannus, which is apparently the Cymric *Aber-afon*, "river-mouth."

The Cape Epidium is evidently the Mull of Cantire. I venture to think that no doubt would ever have arisen with regard to this identification if the interpreters of Ptolemy had always based their investigations on a construction of the Ptolemaic map. The island Epidium, off the north coast of "Ivernia," I believe to be Cantire over again—a duplication naturally resulting from Ptolemy's having worked, in the manner previously suggested, from separate maps of Ireland and Scotland. A map of Ireland now before me shows in its upper right-hand corner the peninsula of Cantire and the islands of Islay, Jura, and Arran. If the map extended further to the north, the next considerable island to be included would be Mull. These facts appear to afford a hint respecting the identification of the islands mentioned by Ptolemy as adjacent to this part of the Irish coast. He places on the sixty-second parallel Ebuda, another Ebuda, and Ricina; and a little further north is Maleus. These five islands are collectively called by him the Ebudæ. A little south of these is Monæda. The two Ebudæ proper may be identified with Islay and Jura, the close mutual proximity of which may account for their being bracketed together under a common name. Ricina, from its name and its position near to Fair Head, seems to be Rathlin (Irish *Rechra*, genitive *Rechrann*). Maleus—the position and the name again concurring—appears to be Mull. There is some uncertainty as to the reading of Monæda. Some editions have Monarina; and Mr. Skene, on the evidence of the coincidence of name, identifies the island with Arran. It seems, however, probable that both Monæda and Monarina are corruptions of Monapia. This name, which is given by Pliny as that of an island in the Irish Sea, is the legitimate phonetic ancestor of Manaw, the Welsh name of the Isle of Man. It is more likely that Ptolemy should have omitted to mention Arran than that he should have overlooked the Isle of Man, and the situation of "Monæda" agrees better with the latter than with the former. Ptolemy's Mona, placed by him near the Wexford coast, is certainly not the Isle of Man, but Anglesey.

The Ebudæ (Hebudes) are referred to by Pliny, but the situation assigned to them by the earlier writer differs extremely from that given by Ptolemy. It seems on the whole most probable that Ptolemy is correct in his application of the name, and that his predecessor had confounded the Hebudes with the

Orkneys. As is well-known, an early mis-reading of Hebudes has given rise to the modern name Hebrides, which has been strangely misappropriated to the north-western group of islands.

Returning to the coast-line of the mainland, we find the Lemannonian Bay, corresponding in position with the entrance to Loch Fyne. The name, however, bears an obvious resemblance to that of Loch Lomond, and Mr. Skene has suggested that Ptolemy's informants must have imagined that that lake communicated with the sea. A more probable supposition would surely be that Loch Lomond (from the Gaelic *Leamhan*, elm trees) had given the name of Lemannonii (compare Damnonii) to the population of the district extending from its shores to those of Loch Fyne.

The river Longus is happily identified by Mr. Skene with the river known in Gaelic as "the long river" (*Avon fhada*) and in English as the Add.

The western coast from this point northwards was evidently very slightly known to Ptolemy's authorities. He does not mention a single town in the western half of the country north of the Clyde, and in the outline of the coast after the river Longus he indicates only three points—the river Itys, Volsas Bay, and the river Nabæus. Ptolemy's coast-line is so inaccurate that any precise identification of these places is quite out of the question, unless we can find some clue in correspondences of local nomenclature. I would suggest that the name Itys may possibly be preserved in Loch Etive, that of Volsas in Loch Alsh, and that of Nabæus (or as others read Nabarus) in the river Naver. The situation of the two former agrees satisfactorily enough, but the Naver discharges itself on the true northern coast (Ptolemy's eastern) and not on the western coast as the position assigned by Ptolemy would indicate.

In spite of Ptolemy's mistaken orientation of the map, he could not set aside the universal concurrence of evidence which placed the Orcades and Thule in the ocean to the north of Britain. In his map these islands are consequently shown as opposite to what is really the west coast. Between the Orcades and the mainland is the island of Dumna, which would appear to be either Skye or the Long Island (Lewis and Harris). If Dumna be Skye, there is a possibility that the dimensions given by Ptolemy to Thule may be those of the Long Island, as represented in the map from which he copied.

Cape Wrath is called by Ptolemy, Tarvedûm (*Tapovedoùμ*). Earlier writers have Tauroedunum (compare Ptolemy's *Tapoδούνον* in Gaul), the Celtic etymon of which seems to be *tarw*, a bull. Possibly the headland was so called from some fancied resemblance in the shape of the rocks. The next cape, Virvedrum,

seems to be identified by its name with Farout Head. This very English-looking appellation is presumably an adaptation of a Gaelic name. The old Celtic prefix *vir* becomes in Gaelic *for*, and the word *fothar*, the equivalent of *vedrum*, would in composition lose its initial *f*, as it does in Dunnottar (anciently Dunfoeder). In this way the ancient name, Virvedrum, would by normal phonetic development assume a form which might easily be corrupted into "Farout." The last of the three headlands on the right of Ptolemy's map, Verubium, is presumably Duncansby Head.

The identifications just proposed are at variance with those advocated by Mr. Skene, who considers that Ptolemy ignored Cape Wrath, and supposed that the coast extended in a straight line from Ross-shire to Dunnet Head, which he identifies with Tarvedûm, so that Virvedrum and Verubium would correspond to Duncansby Head and the Noss. There is something to be said for this hypothesis—amongst other things, that it would make the Nabæus correspond correctly in position with the Naver. But the phonetic correspondence of Virvedrum and Farout, if it be sound, is of course fatal to this theory.

The island Ocitis, in the extreme right of the map, doubtless represents one of the Orkneys in the position which it occupied in the map which Ptolemy followed. The name no longer exists, as all these islands have received new names from the Scandinavians.

Ptolemy gives Orcas as an alternative name for Tarvedûm; but the name must have belonged to the cape nearest to the Orkneys, *i.e.* either to Dunnet Head or Duncansby Head.

Ptolemy's outline of the eastern (regarded by him as the southern) coast of Scotland is singularly correct, the remarkable bend about the Moray Firth being very distinctly recognisable. Most of the river-names given in this part of the map still survive. The Ila is the Ulie, otherwise called Helmsdale. The Loxa has been identified with the Loth, with which it corresponds well enough in position, though I do not know whether the identity of the name is phonologically admissible. The position given in some copies of Ptolemy would allow us to identify the Loxa with the Lossie in Moray, which would involve less difficulty. Varar, the name of the Moray Firth, is identical with the modern river-name Farrar, although the lower portion of this river is now called the Beaully. The Tuæsis has changed its name to Spey. The Celnus (a Gaelic Caolan) seems to be the stream which runs by the town of Cullen. After passing the headland Tæxalum (the north-eastern angle of Aberdeenshire) we come to the Deva (now the Dee), which gave its name to a town, Devana; then to the

Tava (the Tay), which similarly gave its name to the town of Tameia. The Tina appears from its position to be the Eden. Next comes the estuary Boderia, which is evidently the Firth of Forth. The etymology of Boderia (or Bodotria, as Tacitus calls it) is evident from an old Irish gloss quoted by Zeuss, which renders "*de rivo turbulento*" by *dintsruth buadarthe*. The town of Alauna evidently derives its name from the little river Allen, which falls into the Forth near Stirling.

The deflected portion of Ptolemy's map includes not only Scotland, but the east coast of England as far as the Wear. It is remarkable that the Solway and the Wear—the points at which the deflection commences respectively on the west and the east coasts—have precisely the same true latitude. That is to say, the division-line between the two separate maps which Ptolemy followed ran exactly east and west, just as my hypothesis requires that it should have been intended to run. The force of this corroboration is not lessened by the admission that the extraordinary precision with which the line was drawn must have been due as much to the good fortune as to the skill of the ancient surveyors. A further confirmation will be found in the manner in which Ptolemy represents the coast-line from the Forth to the Wear. If the reader will cut a map of Great Britain in two along the line from the Solway to the mouth of the Wear, and then placing the northern half on its side, attempt to join the two parts together, he will find it necessary both to shorten the distance from the Forth to the Wear, and to bring the Wear down to about the position occupied by the Tees. Now this is precisely what Ptolemy has done.

The rivers Alne (Alaunus) and Wear (Vedra) still bear the names by which they are mentioned in Ptolemy. The Tweed and the Tyne are both ignored. The latter omission is somewhat surprising, but may perhaps be accounted for by the fact that the name of Tina had been given—whether rightly or by mistake—to the Fifeshire Eden.

On the coast between the Wear and the Humber (Abus) Ptolemy mentions only three points: Dunum Bay, the Bay of the Gabrantuici—otherwise called the bay of the good harbour—and the Cape of Ocelum. The identification of these points will probably never be decisively settled. Ptolemy places Dunum Bay on the same latitude with Eboracum; but no importance whatever can be attached to this fact, inasmuch as his internal geography is evidently derived from a source different from (and much inferior to) that which he has used for the coast outline. His delineations of the coast between the Vedra and the Abus bear a curiously close resemblance in configuration to the true coast-line from

the Tweed to the Humber. It would be a possible, if a bold hypothesis, that Ptolemy had before him a correct outline of the coast from the Tweed downwards, but erroneously fancied that its initial point was at the Wear. If we could be at all certain of this, our course would be perfectly clear. Dunum Bay would then be the mouth of the Tees, the "well harboured" bay would be (very appropriately) at Scarborough, and Ocelum would be Flamborough Head. This last identification would be beyond question if we could accept the etymology favoured by Mr. Elton and others, which derives Ocelum from the Cymric *uchel*, high. But it is not probable that the old Celtic *uxel* had in Ptolemy's time assumed the form *uchel*, nor that *uchel* would have been represented by him as *Οκελον*. It is not impossible that Ocelum may be Spurn Head; but on the whole I am disposed, though not very confidently, to adhere to the identifications above indicated.

The native form of Abus was most probably *Ab*, which is of frequent occurrence as a Celtic river-name. It may, however, have been the well known *aber*, estuary, in which case Ptolemy's orthography is a mistake for Abarus.

The names of the two peoples inhabiting Yorkshire—the Brigantes and the Parisi—seem to denote respectively the inhabitants of the "highlands," and those of the Parth-is, or "lower district."^a

The Metaris estuary is of course the Wash. The tongue-like projection to the south of this estuary is a very distorted representation of Norfolk, Suffolk, and part of Essex. Ptolemy gives to the population of Norfolk and Suffolk the name of Simeni. This is probably a mistake for the well-known name of Iceni, found in Tacitus and Antoninus, the words *Εικενοι* and *Σιμενοι* being very much alike when written. There seems to be no authority for the usually accepted long quantity of the e in Iceni. The Garriennus is now the Yare, the name having passed through the intermediate forms Gerne and Yerne.

The Blackwater has in Ptolemy the name of Eidumania, in which we seem to have the Celtic word for deep (*domun*, in modern Welsh *dufn*). The Jamesa estuary is, of course, the Thames, the name being obviously mis-written for Tamesa (*cf.* in Tamesæ Æstuario, *Tac. Ann.* xiv. 32). The islands Toliapis and Cōūnnus can only be Sheppey and Thanet respectively, although Ptolemy has considerably mistaken their positions. We have it on the authority of Bede that Thanet was formerly separated from the mainland by a sea-channel of some width. The Cantian promontory is commonly identified with the North Foreland. This identification appears unlikely, because the North Foreland is on the isle of

^a The first portion of the word Parisi cannot be *parth*, but it may perhaps be some synonymous derivative from the same root. Compare the Parisii of Gaul.

Thanet. The South Foreland, which has been suggested by some writers, is more probable, but I prefer to identify the Cantian promontory with Shellness Point in Sandwich Haven, on account of its proximity to Rutupiae, now Richborough.

The inclination of the south coast is given by Ptolemy with a tolerable approach to correctness, so that we are able to apply a sort of fixed scale to his measurements. By this means I believe it will be possible satisfactorily to settle several much debated questions respecting the identification of the positions which Ptolemy has laid down.

It must be borne in mind that Ptolemy's distances in longitude were obtained not from astronomical observations, but from reductions of itinerary distances. I have previously mentioned that his estimate of the circumference of the earth was one-sixth too small. His angular measurements must therefore be reduced in this proportion, so that one of his degrees will really correspond to 50' of our measure. But in applying this result to his measurements of the south coast, there is a further correction which it is necessary to make. We find that he has made the latitude of this coast on the average 2° too high. The consequence is that his degrees of longitude are here four per cent. shorter than he would have made them if he had known the latitude correctly. This rectification makes Ptolemy's degree of longitude in this region equal only to 48' of true measure, so that we have to deduct one-fifth from his distances in longitude to reduce them to their real value. The difference in longitude between Cantium and the Tamar (Tamarus) is given by Ptolemy as 6° 20' of his measure, which, according to the principle of calculation just explained, is equal to 5° 4' of ours. Now the actual distance in longitude between Cantium (taking its position as 1° 20' east of Greenwich) and the nearest part of Plymouth Sound is 5° 27', so that Ptolemy's measurement is only 23' short of the truth. This close approach to accuracy shows that for this portion of the coast Ptolemy's means of information must have been unusually good. We have therefore reason to expect that his measurements will yield trustworthy results when applied to the identification of the intermediate points.

Proceeding westward from Cantium, we come first to the New Harbour, distant from that point 1° of Ptolemy's measure, or 48 of our minutes. The resulting position, 0° 32' east of Greenwich, is about two miles west of Hastings. Although Hastings is now without a harbour, it is known formerly to have possessed one of great importance, and it still ranks at the head of the list of the Cinque Ports. Forty minutes further west, Ptolemy places a river Trisanton, which ought to

fall exactly on the meridian of Greenwich. The mouth of the Sussex Ouse is only two miles from the point thus indicated. Although, however, the Trisanton seems to correspond in position with the Ouse, it is now certain that the river intended by Ptolemy is the Arun. In the *Academy* for April 28th and May 19th, 1883, I showed that Trisanton or Trisantona is the original form of Trent or Tarrant, and occurs in a hitherto misread passage of Tacitus (*Ann.* xii. 31) as the name of our great Midland river. It has subsequently been pointed out by Mr. R. Nevill that my conclusions necessitate the identification of Ptolemy's Trisanton with the Arun, that river appearing in old maps as the *Tarant*. I may mention that the name of Trisanton seems to have belonged to no fewer than six British rivers. One of these is the Hampshire Test, this river being mentioned in Anglo-Saxon charters as the *Tersta*.

The position of the Great Harbour, 3° from Cantium, answers to long. 1° 4' west. This is the exact longitude of the entrance to Portsmouth Harbour, with which the Great Harbour has been almost universally identified. This identification rests on strong historical grounds quite independent of Ptolemy's longitudes. It will be seen on reference to the map that Ptolemy has placed Venta (Winchester) exactly in its true position relatively to the Great Harbour.

Up to this point we find Ptolemy's distance in longitude almost absolutely correct. His loss of 23', before referred to, is therefore to be localised somewhere between Portsmouth and the Tamar. In order to assign more accurately the part of the coast in which this error occurred, it will be well, as the identification of the intervening points is uncertain, to commence our measurements at the Tamarus and proceed eastward. Taking as the longitude of the Tamarus that of the eastern side of Plymouth Sound (4° 7' west), we shall find the position of Ptolemy's river Isaca to correspond to longitude 3° 3' west, the exact longitude of the mouth of the Axe. The Isaca has been commonly identified with the Exe, and it may seem strange that Ptolemy should have omitted the more important river. The names of Exe and Axe, however, are etymologically identical, and in Ptolemy's time were probably alike in form. If his authorities gave him two rivers of the same name not twenty miles apart he would naturally suppose that he had to make his choice between two conflicting reports of the position of one and the same river. The Alaunus or Alænus, 40' of Ptolemy's measure further to the east, should be at longitude 2° 31' west from Greenwich. The mouth of the Wey is at 2° 26', or 5' too far east. If the reading of Dr. Nobbe's edition be correct with regard to the position of Dunium, the identification of the Alaunus

with the Wey is confirmed by the obvious resemblance which the coast-line east of the Alaunus bears to the outline of the Isle of Purbeck.*

It thus appears that Ptolemy's deficiency of 23' (true measure) in the distance from Cantium to the Tamarus is made up of 5' between the Axe and the Wey, and 18' between the Wey and Portsmouth. The latter portion of the error is probably due to a confusion between Portsmouth Harbour and the Southampton Water, the distances from the Great Harbour being measured eastward from the latter and westward from the former. The astonishing exactness of these measurements must be due in some degree to accident: but it must be remembered that the coast-line from the Straits of Dover to Plymouth is precisely the portion of the British shores which would naturally be most accurately known by Roman navigators. With the Cornish coast, lying remote from the Roman settlements, and dangerous to approach closely, they would probably be very slightly acquainted. It is therefore not surprising that west of the Tamar Ptolemy's measurements become quite unmanageable. The distance from the Tamar to the Lizard (Ocrinum or Damnonium), which is really about one degree, is magnified by him into nearly four degrees. The only intermediate point which he mentions is the mouth of the Cenion. If we are justified philologically in connecting Cenion with the local name of Kenwyn, it would follow that this river mouth must be identified with the estuary of the Fal. Ptolemy's measurements are here so obviously worthless that they need not form any difficulty in the way of this identification.

The Land's End is called by Ptolemy Antivestæum or Belerium. The latter name is used by an earlier writer, Posidonius, as the designation of the Cornish peninsula. Prof. Rhys explains it by the Irish *belre* (later *berla*), meaning "language." As this word is used frequently in the special sense of foreign language, Prof. Rhys draws the conclusion that the ancient inhabitants of Cornwall spoke a non-Celtic language. If it be permissible to suppose that *belre* originally meant "tongue" in the physical sense, the appropriateness of the word as a name for Cornwall will become much more obvious.

On the north side of the Damnonian peninsula, Hartland Point appears as the Cape of Hercules—a name which seems to support the somewhat unpopular

* I was at one time inclined to identify the Alaunus with the Stour, on the ground that one of the tributaries of that river still bears the name of Allen. This, however, is one of the commonest of our river names, and there is no improbability in supposing that it may have belonged to both rivers. They are farther apart than are the Axe and the Exe.

theory that Ptolemy derived some portion of his British geography from reports of Phœnician or Carthaginian voyages.

The estuary of the Severn (Sabriana) is correctly laid down. On the south coast of Wales we have the rivers Tubius or Tobius (obviously the Towey), and Ratostathybius. The latter river agrees in position with the Neath or the Burry, but with regard to its name it seems to be the Towey over again. As the Towey makes a common estuary with the Taf, it seems possible that Ratostathybius may mean "the sands of Taf and Towey," in modern Welsh, *Traeth Taf a Thywi*.^a

After rounding Cape Octapitarum (St. David's Head) we come first to the river Tuerobis. This is evidently the Teifi, but the identity of the names is impossible phonologically unless we accept the ingenious suggestion of Prof. Rhys and read *Toveróβιος* instead of *Tovepóβιος*. The Stuccia, from its name, may be inferred to be the Ystwyth. As the Latin word *fructus* has become in Welsh *ffrwyth*, the ancient form of Ystwyth would probably be Stucta, from which Ptolemy's Stuccia or Stucia is not very far removed. It may seem strange that so insignificant a stream as the Ystwyth should be mentioned by Ptolemy, while the Dovey and the Mawddach are ignored. Welsh tradition, however, relates, that in historical times a large tract of country (the so-called Cantref Gwaelod) has been submerged in Cardigan Bay. It is therefore possible that Ptolemy's outline of the west coast of Wales may, in his time, have been very nearly correct, and that the mouth of the Ystwyth may really have been the most conspicuous estuary in Wales north of the Teifi.^b

It is worthy of note that Ptolemy has correctly placed the cape of the Gangani (*i. e.* Braich-y-pwll, at the extremity of Carnarvonshire) due north of the mouth of the Teifi. The name of the people from whom the promontory is called is given in other editions of Ptolemy as Cancani. This form would accord with the Cangi of Tacitus, and would admit of a satisfactory explanation from the Welsh word *Cainc*, a branch, which might be understood as referring to the form of the peninsula of Lleyn. If Cancani be the correct reading, the form

^a The ancient form of the word *traeth* would be *tractos*.

^b This supposition enables us to account for the extraordinary fact that the town of Aberystwith, the name of which means "the mouth of the Ystwyth," does not stand on this river at all, but on the north bank of the Rheidol, while the Ystwyth discharges itself a mile further to the south. If the coast-line formerly stood a few miles west of its present position, the Ystwyth would receive the Rheidol as a tributary. The town at the mouth of the Ystwyth, being gradually driven back by the encroachments of the sea, would retain its original name even when it had ceased to be appropriate.

Gangani is probably due to the name having been assimilated to that of a tribe placed by Ptolemy on the west coast of Ireland.

It has been supposed by some writers that Ptolemy's outline of the north coast of Wales includes Anglesey as a part of the mainland, and that consequently the mouth of the Tæsobis represents the west end of the Menai Straits. The longitude assigned by Ptolemy to this river mouth no doubt favours this identification; and the fact that "Mona" has been already mentioned as an island off the Irish coast does not of itself form any serious objection. The real difficulty is that Ptolemy mentions neither capes nor rivers between the Tæsobis and the Seteia estuary. On this account it seems necessary to regard the Tæsobis as the Conway, although the position given is materially incorrect, and the station Conovium in the Antonine Itinerary shows that in the second century the Conway already bore its present name. In the map accompanying the Latin edition of 1478 the Tæsobis is placed on the west coast, its position corresponding to that of the Mawddach.

An inspection of the map will at once suggest that the Seteia (or Segeia) and the Belisama are respectively the Dee and the Mersey. Ptolemy's distance from the Cape of the Gangani to the Seteia estuary is 2° of longitude. If we deduct the correction due to Ptolemy's constant error, and the special correction for his error in the latitude of this part of the coast, this distance becomes equal to $1^{\circ}32'$ —which may be regarded as absolutely correct. The name of the Belisama is remarkable from its apparent identity with that of the Gaulish goddess Belisama, or Belesamis, mentioned in inscriptions. The harbour of the Setantii (or Segantii) corresponds in position with the Ribble, and the estuary Moricambe with Morecambe Bay. This modern name must not, however, be regarded as evidence in favour of the identification, as it appears to have been adopted from Ptolemy in the last century. The earlier English antiquaries identified Moricambe with the estuary of the Wampool and the Waver, to which in consequence the name of "Moricambe Bay" is given in the Ordnance map. The etymon of Moricambe is probably the Welsh *Morgamlas*, an estuary (literally, sea-channel).

The difference in latitude between Moricambe and the Ituna (Solway) is very considerably too small. This error appears to be due in part to Ptolemy's having completely mistaken the form of the coast-line between the two points.

Ptolemy's outline of the coast of Alvion is on the whole much more nearly correct than we could have expected to find it. This outline must have been in part based on a collection of fairly accurate measurements of inland distances,

X such, for example, as exists in the nearly contemporary Itinerary of Antoninus. Although, however, sound information respecting the interior of Britain must have been possessed by some of Ptolemy's predecessors, he himself does not appear to have had access to it, inasmuch as the positions which he assigns to the towns are in most cases very wide of the truth. Verolamium, for instance, is placed by him $1\frac{1}{2}^{\circ}$, or, according to his scale, ninety-five Roman miles, north of London, although the distance is correctly given in the Itinerary as only twenty-one Roman miles. Vinovium, which we know to have been Binchester, in Durham, is removed to the neighbourhood of the west coast. Obviously no reliance can be placed on any of Ptolemy's indications of the position of inland places not otherwise known to us; and the limits of the tribal territories are dependent almost entirely on the situation of the towns. Under these circumstances it does not seem that Ptolemy's internal geography of Britain is likely to repay the trouble of a minute examination. I shall, therefore, allow the map to speak for itself, except where the names given by Ptolemy may seem to admit of illustration from etymology, or from the statements of other authorities.

To begin with the northern portion of the island. The situation assigned to the Caledonii by Ptolemy, who makes them extend from Loch Fyne to the Moray Firth, does not seem to be easily reconcileable with the fact that the name of Dunkeld means "the fort of the Caledonians." It is probable that Ptolemy is here in error, because the name of the Vacomagi, who, on his showing, occupied Perthshire, Western Aberdeenshire, and the counties of Elgin and Banff, appears to mean literally the inhabitants of "the empty plain," *i.e.* the open country in opposition to the Caledonian woodland. The designation of "plain" cannot have belonged to a district cut across by the range of the Grampians.

The name of the Damnonii, whose territory corresponds nearly to the counties of Lanark, Renfrew, Dumbarton, and Stirling, is interesting from its identity with that of the people of Cornwall and Devon. The most probable etymon seems to be the Celtic *domun* (modern Welsh *dufn*), meaning "deep"; and both populations may have received their name from the deep valleys characteristic of the regions they inhabited. The town of Colania, belonging to the northern Damnonii, seems to have been named from a river Caolan, which may not impossibly be the modern Kelvin.

The name of the Otadeni is identical with the Guotodin of Welsh poetry, and their country seems to have included the Lothians, together with the counties of Berwick, Peebles, Selkirk, and Northumberland.

The Creones and the Carnonacæ, from the position given to them by

Ptolemy, seem to have some etymological connection with Loch Crerin and Loch Carron.

In the internal geography of South Britain there are only a few points which call for special notice.

The territory of the Cornavii, as shown in the map, reaches from the neighbourhood of the Dee to the estuary of the Severn. The only authority, however, for the extension of this tribe south of Wroxeter (Viroconium) is the position given to their town, Devana; and here there is certainly some mistake. The mention of the twentieth legion proves that Devana is identical with the Deva of the Itinerary (Chester), and therefore has been placed 2° too far south. It seems likely, however, that the situation ascribed to Devana is really that of some other Cornavian town accidentally omitted in Ptolemy's list. Possibly some similar accident may be the cause of the error in the position of Isca, which is unquestionably Exeter, although Ptolemy's figures would seem to favour Mr. Gordon Hills's singular identification of it with Dorchester.

Ptolemy places the south coast of Ireland fully 5° too high in latitude. This fact confirms the view which we have already seen to be probable, that Ptolemy's information respecting Britain came to him in the form of three separate maps, without any indication of their mutual relation. His map is not far wrong with regard to the average length and breadth of the island, but the length is made to run north-east and south-west, instead of north and south, and the outline of the coast is so inaccurate that many of the points admit of no secure identification. The shape of the north coast, however, is fairly recognisable. Robogdium is Fair Head; the river Argita is the Bann, and the Vidua the Foyle; and Vennicium is Malin Head. Of the west side of the island scarcely anything can be said. The Senus corresponds in name, though not in position, with the Shannon, and the north and south capes are respectively the Bloody Foreland and one of the headlands of Kerry. On the south, the river Dabrona (compare the Deveron in Scotland) answers in position to the Blackwater, and the Birgus both in position and in name to the Barrow. The Brigantes, whose territory borders on the Barrow, seem to have taken their name from the river, and to have no connection with the Brigantes of Alvion. The Sacred Cape is clearly Carnsore Point.

On the east side of the island the Buvinda is clearly the Boyne. Ptolemy's orthography shows that the name expressed the singular meaning of "white cow." There is here no doubt some mythological reference, which meets us again in the common Irish name of Inisbofin, the "island of the white cow." The

Logia would seem to be the Lagan or Logan at Belfast; the Vinderius, from its position, may be identified with Strangford Lough, and the cape Isamnium with St. John's Point. Dr. Joyce, however, identifies Isamnium with Rinn Seimhne, which he states to be the old Irish name of Island Magee. The coincidence of name is certainly striking, but as Island Magee is some miles north of Belfast Lough, while Ptolemy's Isamnium is placed a long way south of it, it is difficult to accept the identification. It seems worth while to inquire whether it is quite certain that the Rinn Seimhne of the ancient documents is the same with Island Magee. The river Oboca is probably the Liffey, although the name (under the form Ovoca or Avoca) has been in modern times conferred on a poetically celebrated river in Wicklow county. The Modonus (Irish *meadhon*, middle), if its name had been preserved, would now be Maine or Moyne. No such river-name, however, is to be found in this neighbourhood, and from its situation the Modonus would seem to correspond with the Vartry. The current identification of the town of Eblana with Dublin seems to have no foundation. The names certainly are not identical, and there is no evidence that any town existed in Roman times on the site of the present Irish capital. The island Edrus, marked by Ptolemy as uninhabited, is proved by its name to represent the peninsula of Howth, in Irish Ben *Edar*. The other uninhabited island off this coast, Limnus, may perhaps be Lambay, although in that case the relative situations of Edrus and Limnus have been reversed.

Ptolemy's names of the interior cities and the tribal territories of Ireland do not call for special notice. The only one of his names which seems still to survive is that of the Nagnatæ, which Dr. Joyce finds in the last syllable of Connaught.
